

CLAIMS

1. A method for recycling expanded polystyrene comprising steps of:
 - reducing a volume of the expanded polystyrene;
 - dissolving the volume-reduced expanded polystyrene in a solvent; and
 - extruding the dissolved expanded polystyrene.
2. The method according to Claim 1, further comprising a step of producing recycled expanded polystyrene from the extruded product.
3. The method according to Claim 1 or 2, wherein the volume reducing step comprises volume-reduction by mechanical compression and/or volume-reduction by partial melting at a temperature not greater than 200°C.
4. The method according to any one of Claims 1 to 3, wherein the solvent used in the dissolving step has a boiling point not greater than 150°C.
5. The method according to any one of Claims 1 to 4, wherein the solvent used in the dissolving step is methylene chloride.
6. The method according to Claim 5, wherein the solvent further comprises unsaturated hydrocarbon having 5 to 7 carbon atoms and/or epoxide.
7. The method according to any one of Claims 1 to 6, further comprising a first transportation step for

transporting the volume-reduced expanded polystyrene after the volume reducing step to carry out the dissolving step at another place.

8. The method according to any one of Claims 1 to 7, further comprising a second transportation step for transporting the extruded product after the extruding step to produce recycled expanded polystyrene at another place.

9. The method according to Claim 8, further comprising, after the second transportation step, a step of impregnating the extrusion product with an expanding agent and a third transportation step for transporting the product.

10. A separation and recovery apparatus of a polystyrene solution wherein the polystyrene solution obtained by dissolving expanded polystyrene in a solvent is made to advance in a cylinder while being heated, so that the solvent is vaporized, the polystyrene is separated from the solvent and the solvent is recovered, comprising:

a mixing shaft disposed in the cylinder, comprising mixing impellers being adjacent each other in a shaft direction and being shifted in a circumferential direction.

11. A separation and recovery apparatus of a polystyrene solution wherein the polystyrene solution obtained by dissolving expanded polystyrene in a solvent is made to advance in a cylinder while being heated, so that the solvent is vaporized, the polystyrene is separated from the

solvent and the solvent is recovered, comprising:

a cylinder comprising a first-stage cylinder member and a second-stage cylinder member; and

an mixing shaft disposed in the first-stage cylinder member, comprising mixing impellers being adjacent each other in a shaft direction and being shifted in a circumferential direction,

wherein the second-stage cylinder member comprising a screw shaft is disposed at right angles with the first-stage cylinder member.

12. A separation and recovery apparatus of a polystyrene solution wherein the polystyrene solution obtained by dissolving expanded polystyrene in a solvent is made to advance in a cylinder while heating, so that the solvent is vaporized, the polystyrene is separated from the solvent and the solvent is recovered, comprising:

a cylinder comprising a first-stage cylinder member, a second-stage cylinder member, and a third-stage cylinder member;

an mixing shaft disposed in the first-stage cylinder member, comprising mixing impellers being adjacent each other in a shaft direction and being shifted in a circumferential direction,

wherein the second-stage cylinder member comprising a screw shaft is disposed at right angles with the first-stage

cylinder member, and the third-stage cylinder member comprising a screw shaft is disposed at right angles with the second-stage cylinder member.